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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

HOPKINS, ROBERT A

ART UNIT

PAPER NUMBER

1797

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/536,723	<b>Applicant(s)</b> PY ET AL.	
	<b>Examiner</b> Robert A. Hopkins	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,7-9,12-21 and 24-26 is/are rejected.
- 7) ☒ Claim(s) 2,3,6,10,11 and 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>5-27-05</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

Claims 13-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 13-19 recite "wherein it ..." Examiner is unsure as to what structure is referred to be "it". Correction is requested.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,4,5,7-9,12-14,17,18,20,21,24,25,26 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Japanese reference(8-332375).

Japanese reference teaches a composite material comprising an active solid and a phase change material wherein the phase change material takes the form of micronodules having an average size of between 1 and 5 millimeters, the phase change material is selected from materials with a liquid/solid phase temperature of between -150 degrees C and 900 degrees C, the active solid is selected from solids that can be used in a method involving reversible physicochemical processes that are exothermic in one direction and endothermic in the opposite direction. Japanese reference further

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teaches wherein the active solid comprises a porous and/or microporous solid that can be used in a reversible adsorption process. Japanese reference further teaches wherein the porous and/or microporous active solid is selected from activated charcoals, zeolites, activated alumina or silica gels. Japanese reference further teaches wherein the phase change material is a congruent melting salt(alkali metal salt or alkaline earth metal salt). Japanese reference further teaches wherein the congruent melting salt is selected from hydrated or unhydrated halides, hydrated or unhydrated carbonates, hydrated or unhydrated sulfates, phosphates, nitrates or hydroxides. Japanese reference further teaches wherein the congruent melting salt is selected from one of the salts listed in claim 9. Japanese reference further teaches wherein the active solid takes the form of particles or monoliths. Japanese reference further teaches wherein it comprises a porous or microporous active solid, in the form of monoliths or particles, the micronodules occupying the pores of the active solid. Japanese reference further teaches wherein it is formed by mixing particles or monoliths of active solid and micronodules, the micronodules occupying the spaces between the particles or the monoliths of active solid. Japanese reference further teaches wherein it comprises particles or monoliths of active solid, and particles of a support material on which the micronodules are fixed. Japanese reference further teaches wherein it comprises one or a plurality of monoliths of active solid in which the micronodules are distributed. Japanese reference further teaches a method for controlling thermal effects in a reversible physicochemical process between an active solid and a gaseous compound, the process being exothermic in one direction and endothermic in the opposite direction,

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wherein the thermal effects are controlled by using a composite material as claimed in claim 1 as active solid. Japanese reference further teaches a method for purifying a gas mixture by adsorption and regeneration by pressure modulation, called the PSA method, consisting in carrying out the successive steps of pressurization and depressurization of at least one adsorbent bed by a gas mixture, in order to separate the gas mixture wherein the adsorbent bed comprises a composite material as claimed in claim 1. Japanese reference further teaches a method for storing gas by reversible adsorption on a porous solid, wherein the porous solid is a composite material as claimed in claim 4. Japanese reference further teaches wherein the composite material comprises zeolite or activated charcoal. Japanese reference further teaches a method for extracting oxygen from air by adsorption and regeneration by pressure modulation, called the VSA method, consisting in carrying out successive steps of pressurization by air and of placing an adsorbent bed under vacuum, wherein the adsorbent bed comprises a composite material as claimed in claim 1.

***Allowable Subject Matter***

Claims 2,3,6,10,11,15,16,19,22,23,27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 2 recites “wherein the active solid comprises a reactive solid that can be used in a reversible reaction”. Japanese reference teaches an active solid which is a porous solid, however Japanese reference does not teach a reactive solid that can be used in a reversible reaction. It would not have been obvious to someone of ordinary

skill in the art at the time of the invention to provide a reactive solid that can be used in a reversible reaction because Japanese reference does not suggest such a modification. Claim 3 depends on claim 2 and hence would also be allowable upon incorporation of claim 2 into claim 1.

Claim 6 recites "wherein the phase change material is a paraffin or a mixture of paraffins". Japanese reference fails to teach wherein the phase change material is a paraffin or a mixture of paraffins. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a phase change material which is a paraffin or a mixture of paraffins because Japanese reference does not suggest such a modification.

Claim 10 recites "wherein the phase change material is a metal". Japanese reference fails to teach wherein the phase change material is a metal. . It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a phase change material which is a metal because Japanese reference does not suggest such a modification. Claim 11 depends on claim 10 and hence would also be allowable upon incorporation of claim 10 into claim 1.

Claim 15 recites "wherein it comprises particles or monoliths of active solid on the surface of which the micronodules are fixed, either by chemical grafting or by bonding with an adhesive". Japanese reference fails to teach particles or monoliths of active solid on the surface of which the micronodules are fixed, either by chemical grafting or by bonding with an adhesive. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide particles or monoliths of

active solid on the surface of which the micronodules are fixed, either by chemical grafting or by bonding with an adhesive because Japanese reference does not suggest such a modification.

Claim 16 recites “wherein it comprises particles of active solid fixed on the surface of the micronodules by chemical grafting or by bonding with an adhesive. Japanese reference fails to teach particles of active solid fixed on the surface of the micronodules by chemical grafting or by bonding with an adhesive. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide particles of active solid fixed on the surface of the micronodules by chemical grafting or by bonding with an adhesive because Japanese reference does not suggest such a modification.

Claim 19 recites “wherein it further contains expanded natural graphite”. Japanese reference fails to teach natural graphite. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide expanded natural graphite because Japanese reference does not suggest such a modification.

Claim 22 recites “put into practice to obtain purified hydrogen from a gas mixture, wherein the gas mixture to be processed is a hydrogen rich mixture further containing CO<sub>2</sub> and CM<sub>4</sub>, and it that said mixture passes successively through two adsorbent beds, the first comprising activated charcoal and micronodules of phase change material, the second comprising zeolite and micronodules of phase change material”. Japanese reference teaches a removing oxygen from an inert gas through a single adsorbent bed. It would not have been obvious to someone of ordinary skill in the art at

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the time of the invention to provide two adsorbent beds, the first comprising activated charcoal and micronodules of phase change material, the second comprising zeolite and micronodules of phase change material because Japanese reference does not suggest such a modification.

Claim 23 recites "put into practice to dry air, wherein the gas mixture to be processed is air containing water vapor and in that the adsorbent bed is a composite material an alumina or a zeolite, and the micronodules are paraffin micronodules". Japanese reference teaches a removing oxygen from an inert gas through a single adsorbent bed. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide the adsorbent bed is a composite material an alumina or a zeolite, and the micronodules are paraffin micronodules because Japanese reference does not suggest such a modification.

Claim 27 recites "wherein said material comprises a zeolite and a paraffin with a phase change temperature close to 290K". Japanese reference teaches a removing oxygen from an inert gas through a single adsorbent bed. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a material which comprises a zeolite and a paraffin with a phase change temperature close to 290K because Japanese reference does not suggest such a modification.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert A. Hopkins whose telephone number is 571-272-1159. The examiner can normally be reached on Monday-Thursday, 7:30am-5pm, every Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Rah  
March 12, 2008

/Robert A Hopkins/  
Primary Examiner, Art Unit 1797